

STATE OF RHODE ISLAND

ASSET ALLOCATION FOLLOW UP

October, 2019

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BOSTON | ATLANTA | CHARLOTTE | CHICAGO | DETROIT | LAS VEGAS | PORTLAND | SAN FRANCISCO

SIC GOALS & RISK PREFERENCES: DISCUSSED IN JULY

SIC Goals:

Improving Fund sustainability and progressing towards a fully funded plan

- Maintain or improve probability of 100% funding ratio in 20 years

Risk Constraints:

Achieve a more stable return path by managing and mitigating risks accordingly

- Limit the probability of funding level falling below 50% in next 5 years (current funding level 54%) to ~15%
- Limit the probability of a 2% absolute increase in employer contribution rate (expressed as a percentage of payroll) to ~25% in any given year within next 10 years
 - Note that the discount rate has been updated from 7.5% to 7.0% from the previous objective which was set in September 2016
- Within 90% confidence, maintain at least 3x the annual benefit payment amount in assets with daily/weekly liquidity profile in a recessionary scenario



*The above figures were presented as part of the September 2019 SIC Asset Allocation meeting

PROPOSED NEW ALLOCATIONS TO SAA

- **As part of the asset allocation proposal, we are asking the SIC to make three major decisions:**
 - 1) Whether to add an allocation to **Emerging Market Debt**
 - 2) Whether to add an allocation to **Equity Options**
 - 3) Whether to increase the **CPC program** or keep it as is
- **The mixes that have been profiled provide flexibility around the adoption of the above proposals**



ASSET ALLOCATION REVIEW

								Individual Asset Classes		
		Current Target	Current Allocation	Mix A ¹	Mix A ⁴	Mix A ⁵	Mix A ⁶	Expected Return 5-7 Year*	Expected Risk	Beta to ACWI
Growth	US Equities	22.0%	15.9%	12.7%	12.7%	10.0%	12.7%	6.1%	17.6%	0.90
	Int'l Equities	13.3%	9.2%	7.6%	7.6%	5.9%	7.6%	6.8%	20.5%	1.07
	Emerging Int'l Equities	4.7%	5.1%	4.7%	4.7%	4.1%	4.7%	9.3%	28.0%	1.27
	Global Equity	0%	15%	15%	15%	15%	15%	7.0%	17.6%	1.00
	Global Equity	40%	45%	40%	40%	35%	40%	6.7%	19.8%	
	Private Equity	11.25%	6.96%	11.25%	11.25%	11.25%	11.25%	10.0%	24.2%	1.28
	Non-Core Real Estate	2.25%	1.78%	2.25%	2.25%	2.25%	2.25%	7.0%	17.0%	0.45
	Opp. Private Credit	1.5%	0.6%	1.5%	1.5%	1.5%	1.5%	8.5%	16.0%	0.63
	Private Growth	15%	9%	15%	15%	15%	15%	9.4%	22.3%	
TOTAL GROWTH	55%	54%	55%	55%	50%	55%	7.4%	20.4%	1.03	
Income	Equity Options	0.0%	0.0%	0.0%	0.0%	5.0%	4.0%	4.8%	11.0%	0.70
	Liquid Credit	2.8%	3.9%	2.8%	1.5%	1.5%	2.5%	5.4%	10.8%	0.35
	EMD (Blended)	0%	0%	2.0%	1.5%	1.5%	2.5%	5.6%	13.0%	0.51
	HY Infrastructure	1%	1%	1%	1%	1%	1%	9.5%	21.0%	0.50
	REITs	1%	1%	1%	1%	1%	1%	6.8%	20.0%	0.64
	Private Credit	3.2%	1.7%	3.2%	3.0%	3.0%	3.0%	7.6%	12.0%	0.44
	TOTAL INCOME	8%	8%	10%	8%	13%	14%	7.0%	13.7%	0.44
Stability	Long Treasuries	4%	4%	4%	5%	5%	4%	1.8%	12.0%	-0.10
	Systematic Trend	4%	4%	4%	5%	5%	4%	6.0%	9.5%	0.18
	CPC	8%	8%	8%	10%	10%	8%	3.9%	10.8%	
	Core Real Estate	3.6%	4.5%	3.6%	3.6%	3.6%	3.6%	6.0%	13.0%	0.28
	Private Infrastructure	2.4%	2.0%	2.4%	2.4%	2.4%	2.4%	6.3%	12.0%	0.34
	TIPS	1%	2%	2%	2%	2%	2%	3.0%	6.5%	-0.05
	Commodities	1%	0%	0%	0%	0%	0%	4.3%	19.0%	0.34
	Inflation Protection	8%	8%	8%	8%	8%	8%	5.5%	12.6%	
	Core Bonds	11.5%	11.8%	0.0%	0.0%	0.0%	0.0%	3.0%	6.1%	0.02
	IG Corp. Credit (Core Bonds)	0%	0%	5.25%	5.25%	5.25%	3.25%	4.0%	7.5%	0.11
	Securitized Credit (Core Bonds)	0%	0%	5.25%	5.25%	5.25%	3.25%	2.8%	7.0%	0.02
	Absolute Return	6.5%	7.0%	6.5%	6.5%	6.5%	6.5%	5.7%	8.1%	0.39
	Strategic Cash	3%	3%	2%	2%	2%	2%	2.5%	1.0%	0.00
	Volatility Protection	21%	22%	19%	19%	19%	15%	3.8%	6.0%	
TOTAL STABILITY	37%	38%	35%	37%	37%	31%	4.2%	8.5%	0.14	
Other	Short-Term Cash	0%	0%	0%	0%	0%	0%	2.8%	1.0%	0.00
	Russell Overlay	0%	0%	0%	0%	0%	0%	0.5%	1.0%	0.00
	Total Cash	0%	0%	0%	0%	0%	0%	0.0%	0.0%	0.00
Expected Return 5-7 yrs		6.70%	6.52%	6.79%	6.76%	6.66%	6.83%			
Expected Return 30 yrs		7.81%	7.63%	7.88%	7.86%	7.75%	7.90%			
Standard Dev		11.9%	11.6%	12.1%	11.9%	11.5%	12.29%			
Sharpe Ratio (5-7 years)		0.35	0.35	0.36	0.36	0.36	0.35			
Total Duration		1.64	1.79	1.65	1.74	1.74	1.46			
Total Beta to ACWI		0.65	0.64	0.67	0.66	0.63	0.68			

*Expected Risk/Return figures for each functional bucket and composite is based on the weighted average of the underlying asset classes

**Current allocation is as of May 2019



STOCHASTIC RESULTS

	Current Target	Mix A ¹	Mix A ⁴	Mix A ⁵	Mix A ⁶
<i>Expected Return 5-7 years</i>	6.7%	6.8%	6.8%	6.7%	6.8%
<i>Expected Return 30 years</i>	7.8%	7.9%	7.9%	7.7%	7.9%
<i>Standard Deviation</i>	11.9%	12.1%	11.9%	11.5%	12.3%
<i>Sharpe Ratio (5-7 years)</i>	0.35	0.36	0.36	0.36	0.35
<i>Worst Decile 5-Year Return</i>	-0.1%	-0.1%	-0.1%	0.1%	-0.2%
<i>Chance of Falling Below 50% Funded</i>	14.8%	15.1%	14.4%	14.0%	15.1%
<i>Chance of 2% ARC Increase</i>	22.5%	22.3%	21.9%	19.8%	23.6%

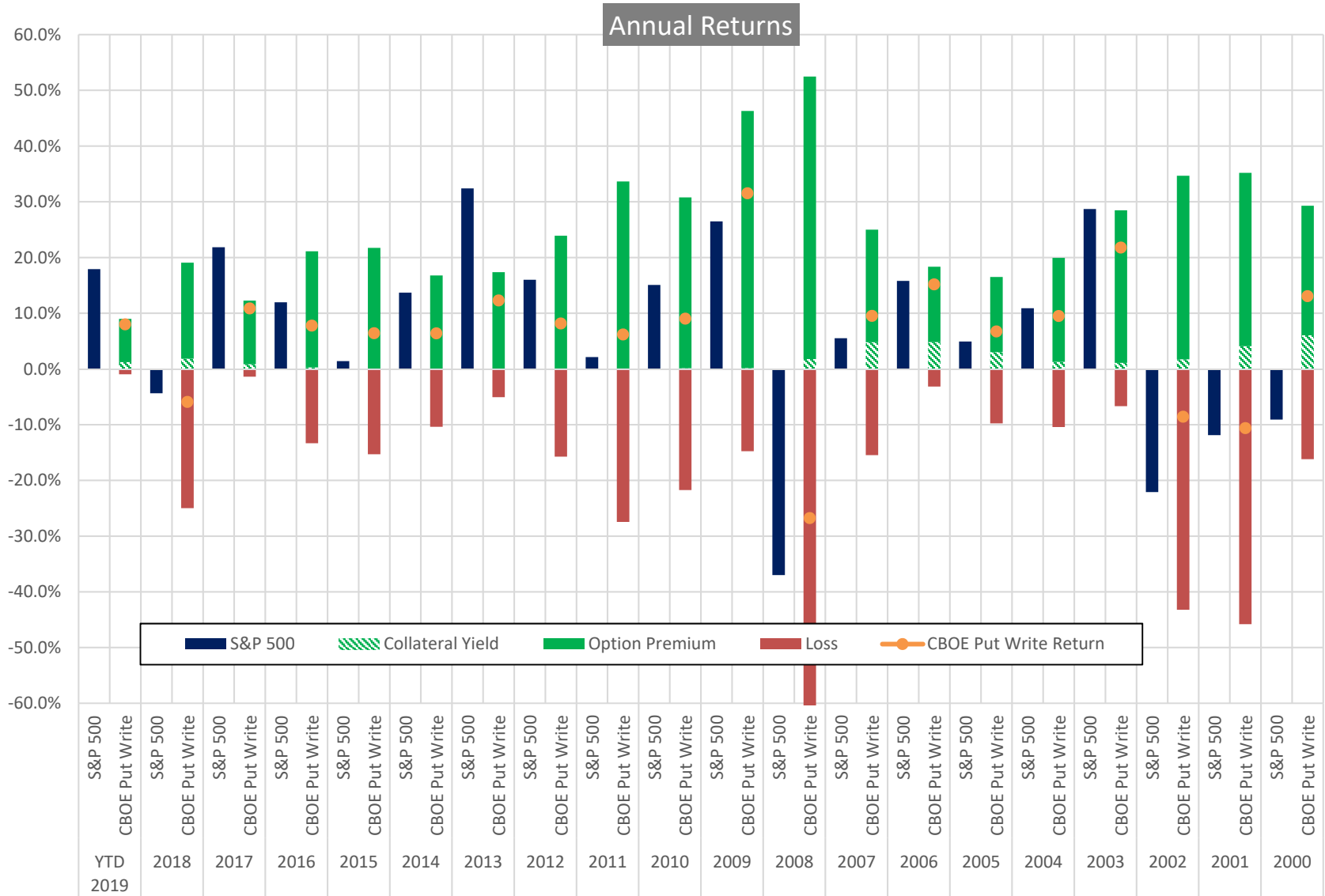
Versus Current Target

<i>Chance of Falling Below 50% Funded</i>	—	↑	↓	↓	↑
<i>Chance of 2% ARC Increase</i>	—	↓	↓	↓	↑

EQUITY OPTIONS: RETURN ANALYSIS

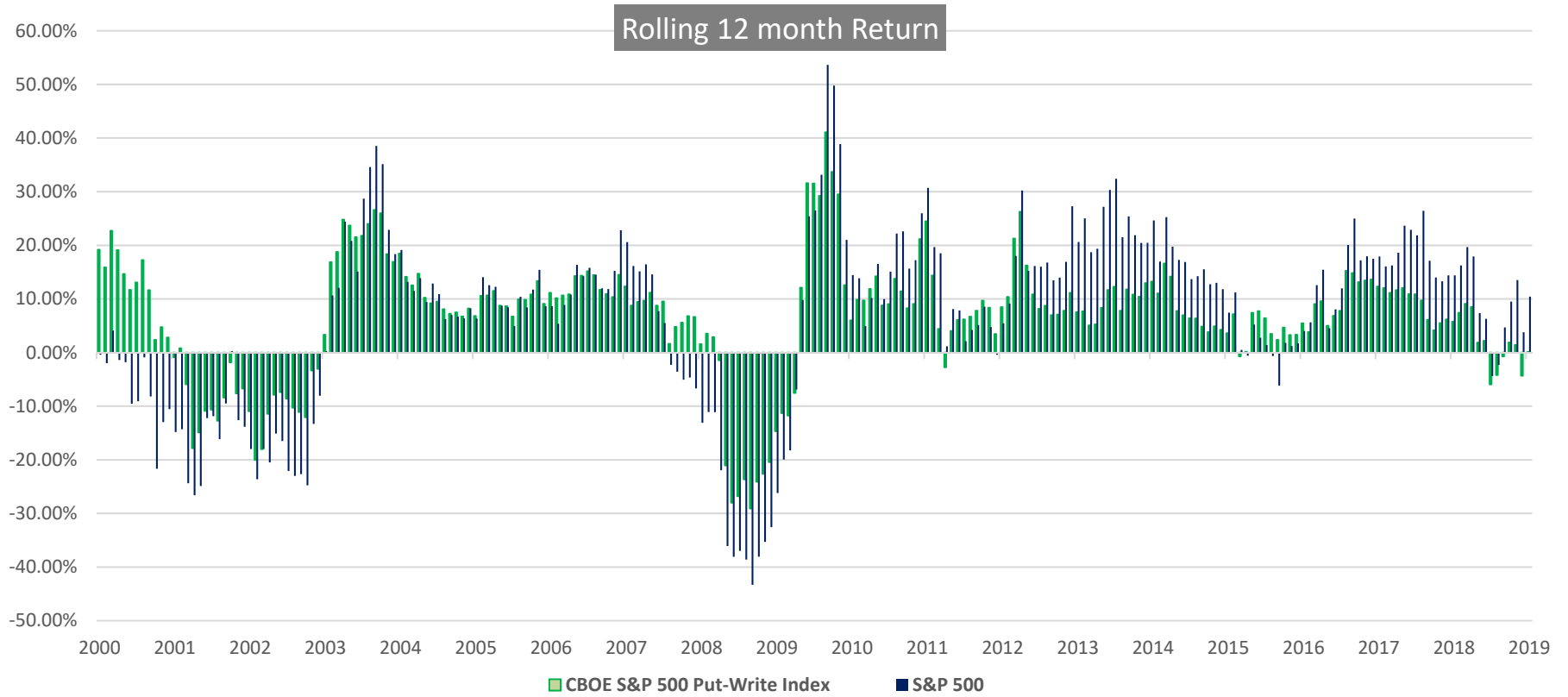
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ANNUAL PUT WRITING RETURNS VS. S&P 500



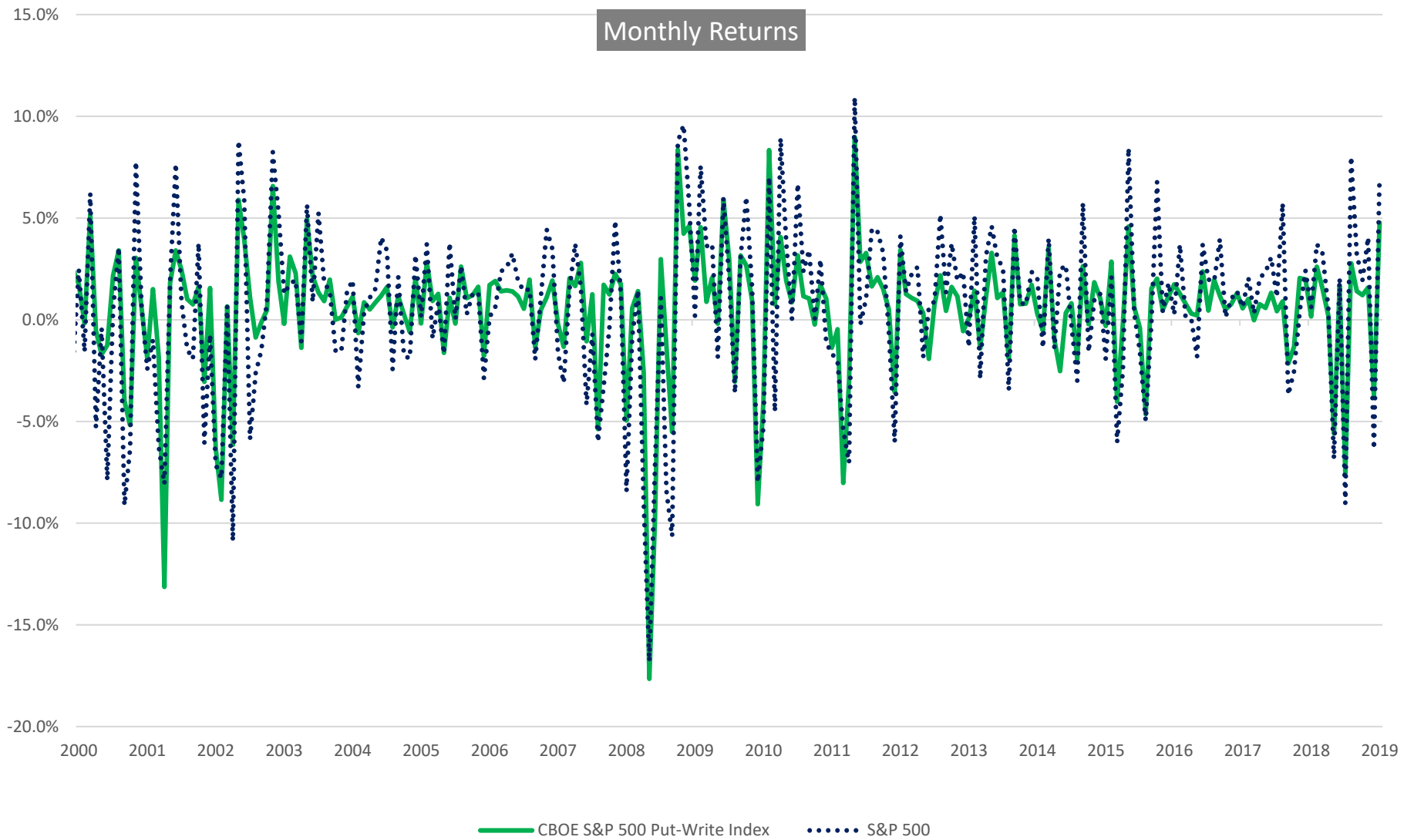
*As of June, 2019

ROLLING 12 MONTH PUT WRITING RETURNS VS. S&P 500



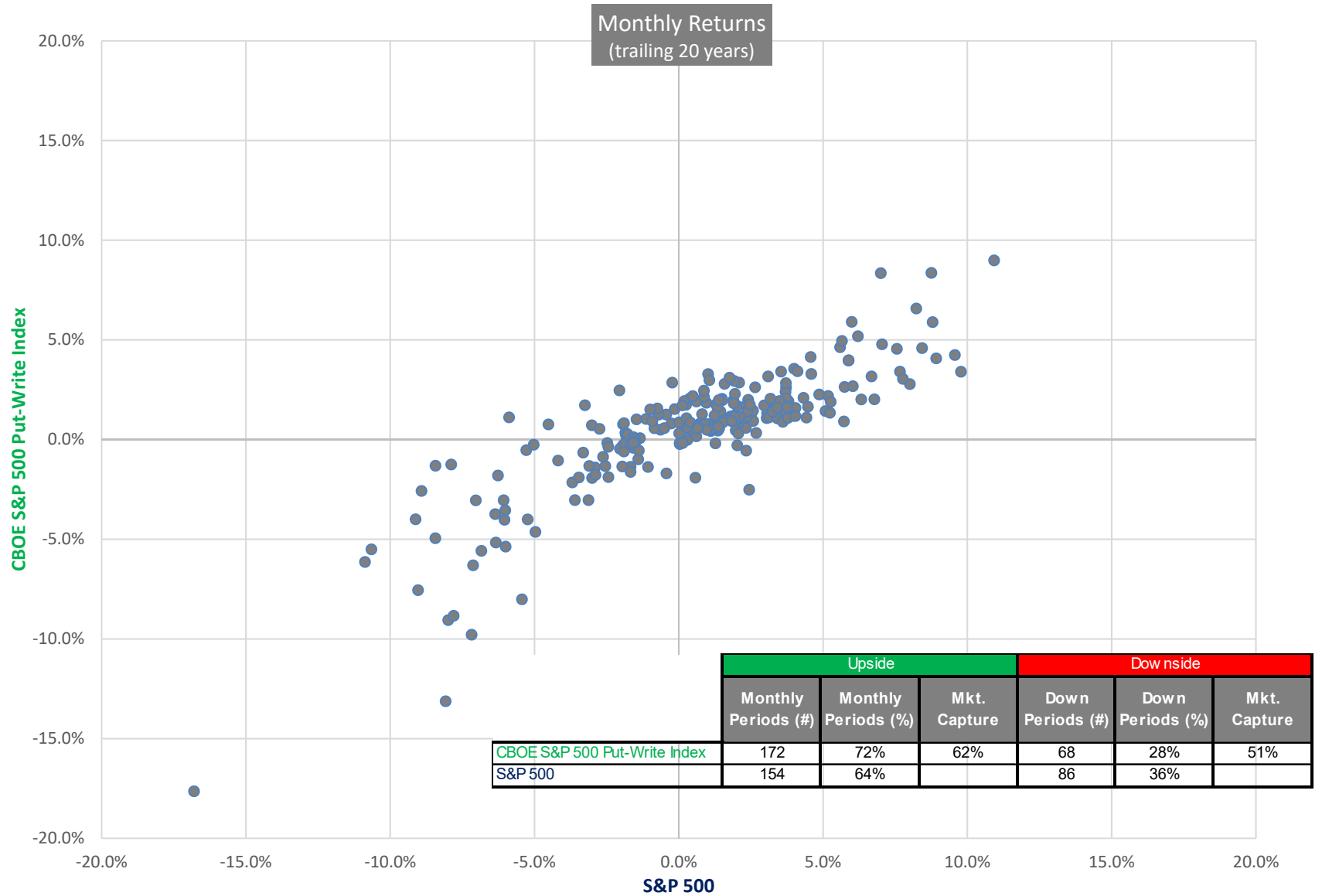
*As of June, 2019

MONTHLY PUT WRITING RETURNS VS. S&P 500



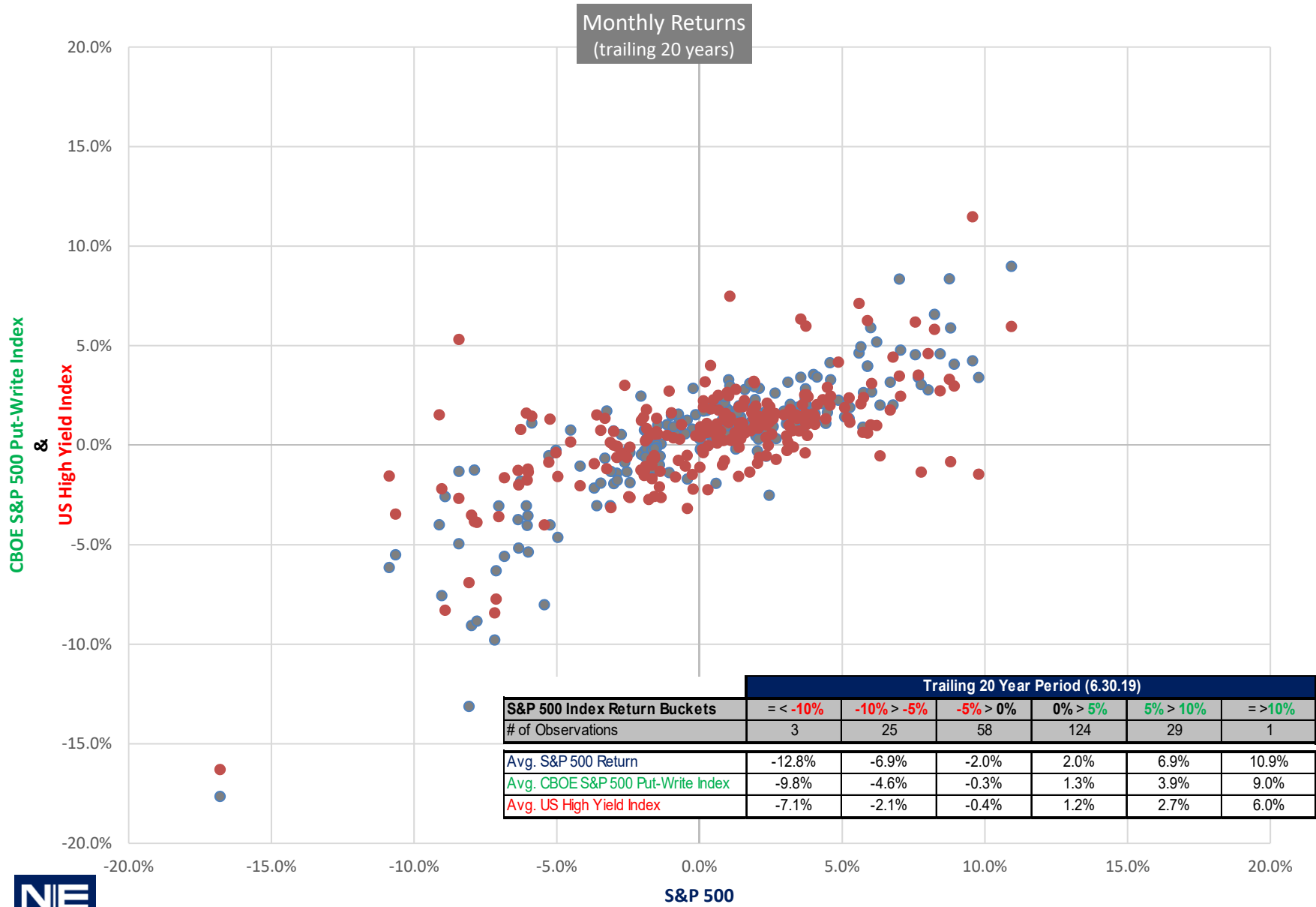
*As of June, 2019

MONTHLY PUT WRITING RETURNS VS. S&P 500

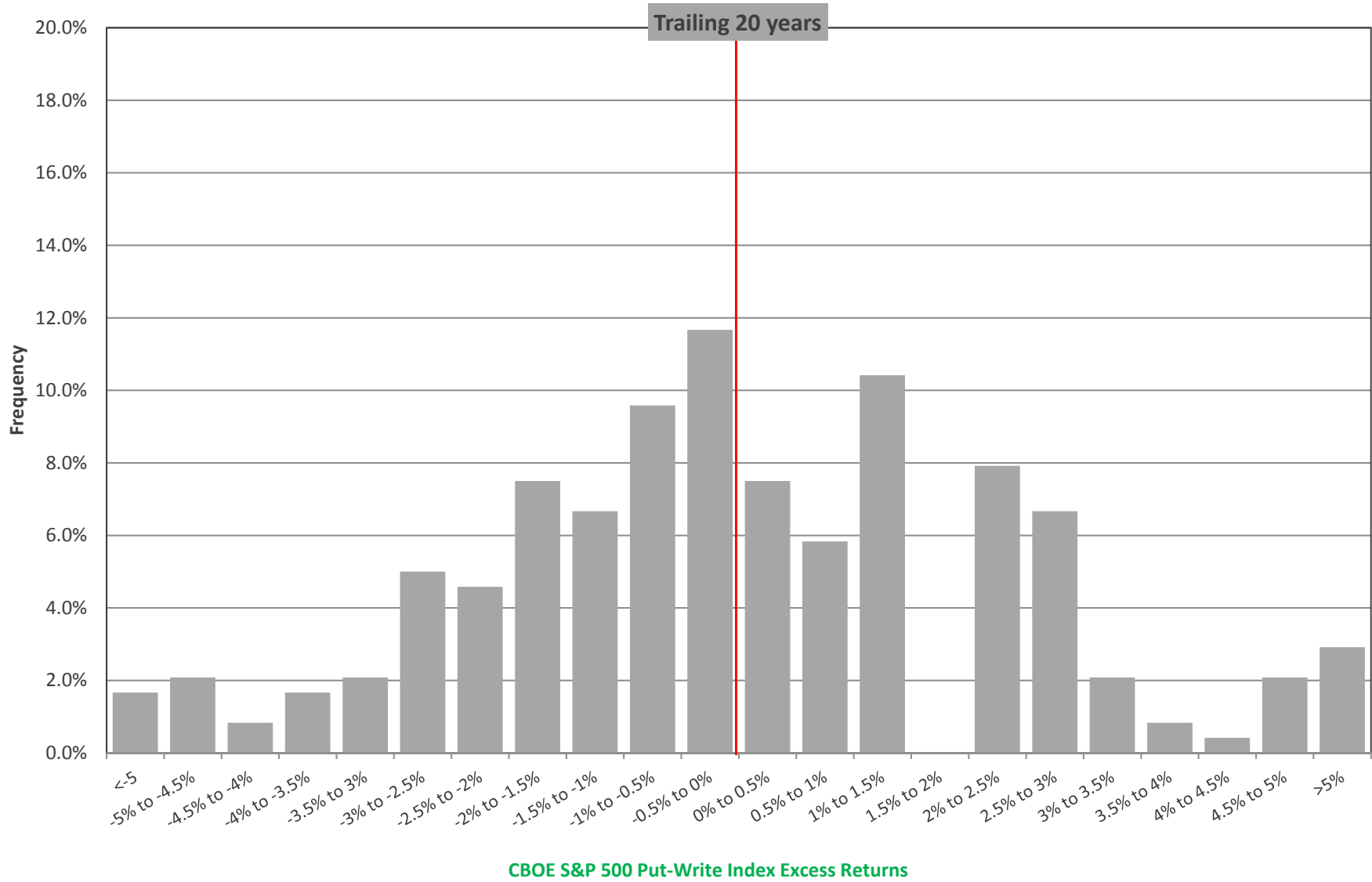


*As of June, 2019

MONTHLY PUT WRITING RETURNS VS. S&P 500



MONTHLY PUT WRITING EXCESS RETURNS VS. S&P 500

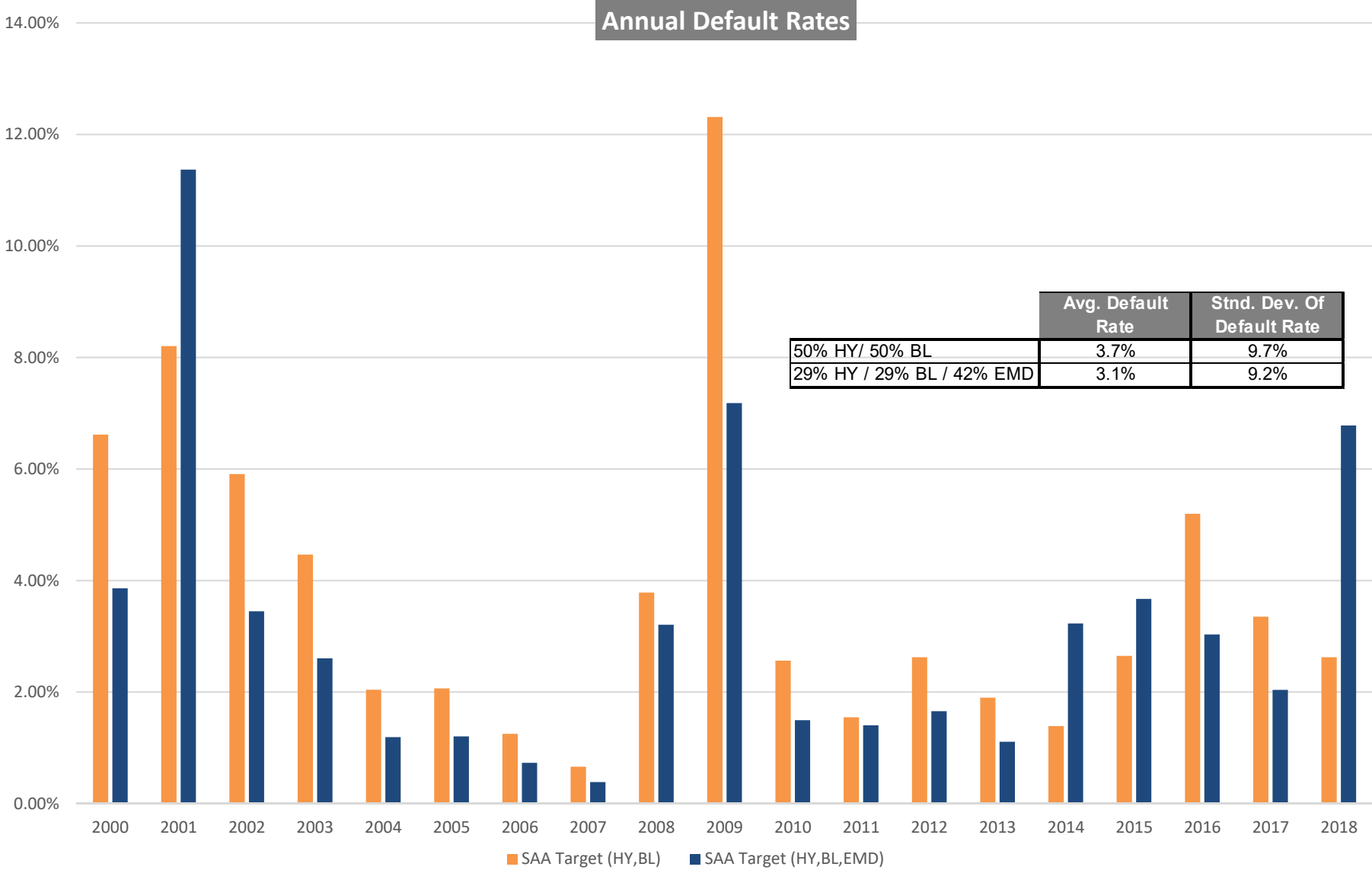


*As of June, 2019

EMD

NEPC, LLC

EMERGING MARKET DEBT DEFAULT RATES



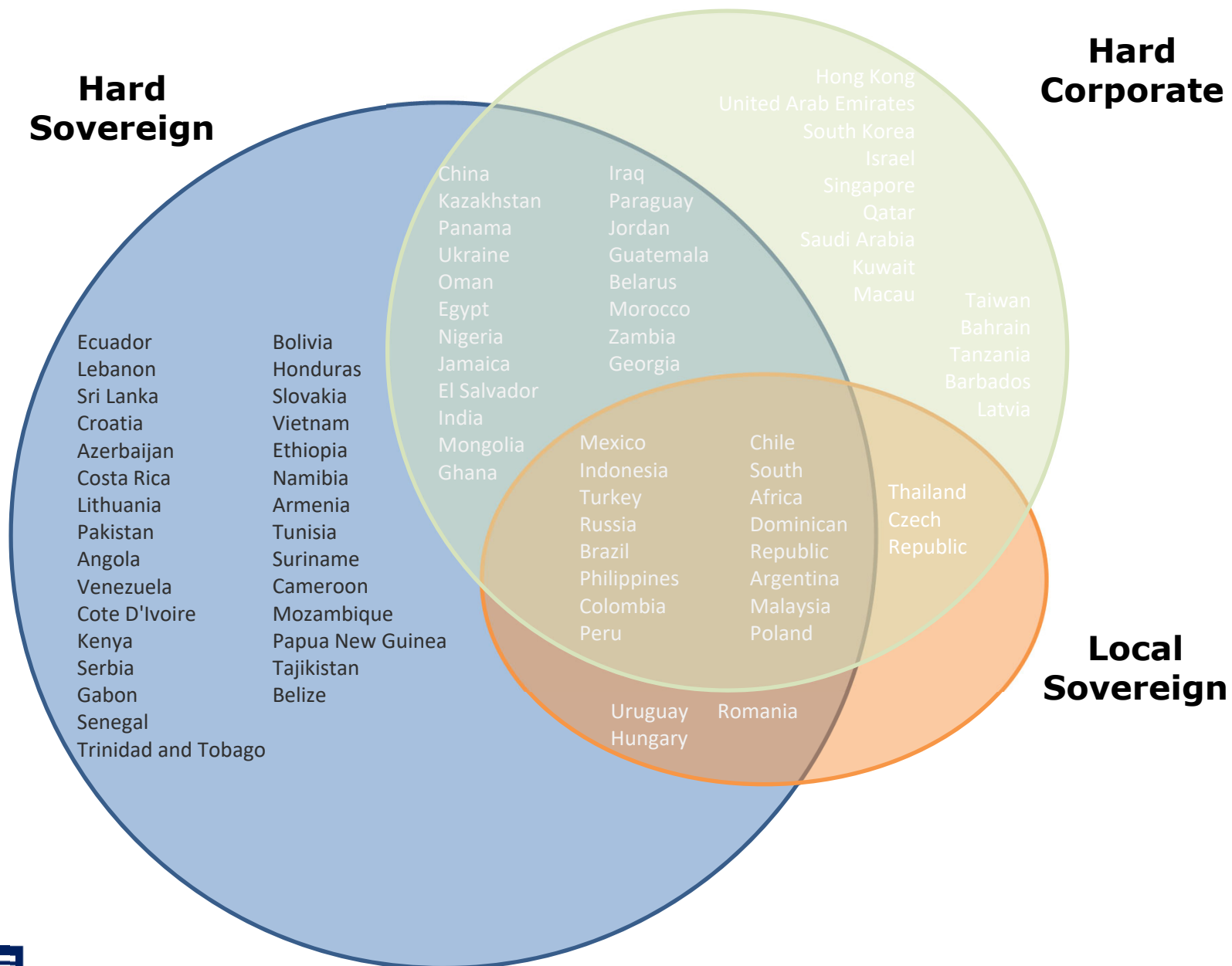
EMD INVESTMENT UNIVERSES

	<u>EM External Sovereign (Hard Currency)</u>	<u>EM Local (Local Currency Sovereign)</u>	<u>EM Corporates (Hard Currency)</u>
	JPM EMBI Global Diversified	JPM GBI-EM Global Diversified	JPM CEMBI Broad Diversified
Duration (years)	6.5	5.1	4.5
Market Value (US \$bn)	520	844	461
Yield (%)	7.1	6.5	6.2
High Yield (% of index)	46.1%	15.7%	38.1%
Investment Grade (% of Index)	53.9%	84.3%	61.9%
	<p> ■ Latin America ■ Asia ■ Europe ■ Africa/Middle East </p> <p>Total ex-Asia: 80%</p>	<p> ■ Latin America ■ Asia ■ Europe ■ Africa/Middle East </p> <p>Total ex-Asia: 77%</p>	<p> ■ Latin America ■ Asia ■ Europe ■ Africa/Middle East </p> <p>Total ex-Asia: 64%</p>

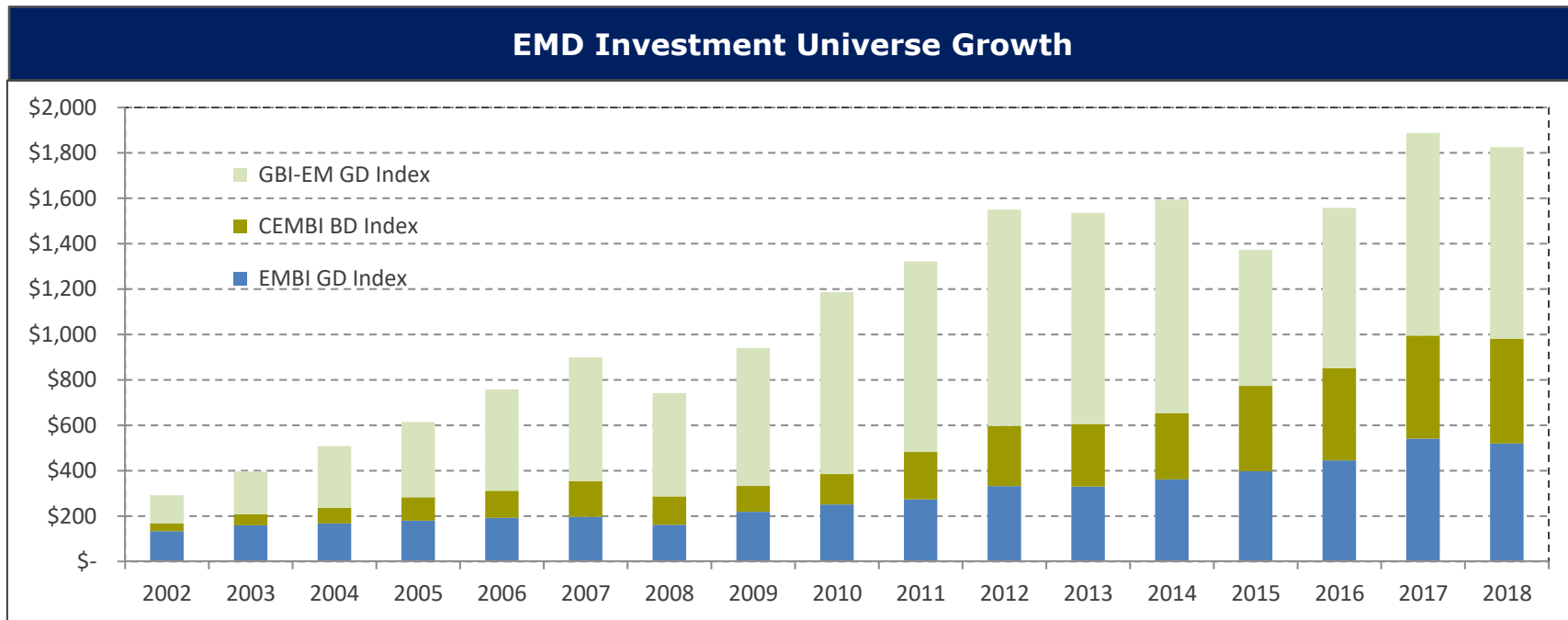
Source: Ashmore Group, Bloomberg, J.P. Morgan, as of December 2018



EMD INVESTMENT UNIVERSES



EMD: AN EXPANDING OPPORTUNITY SET



Yield and Ratings

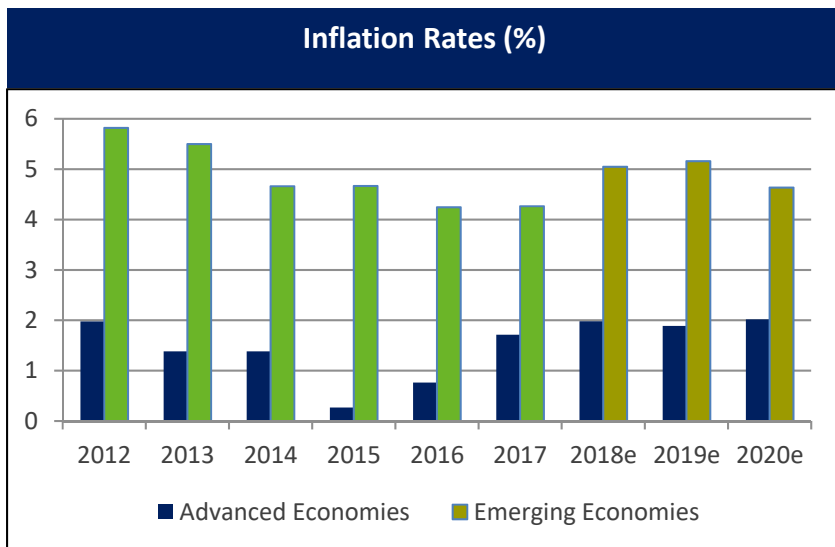
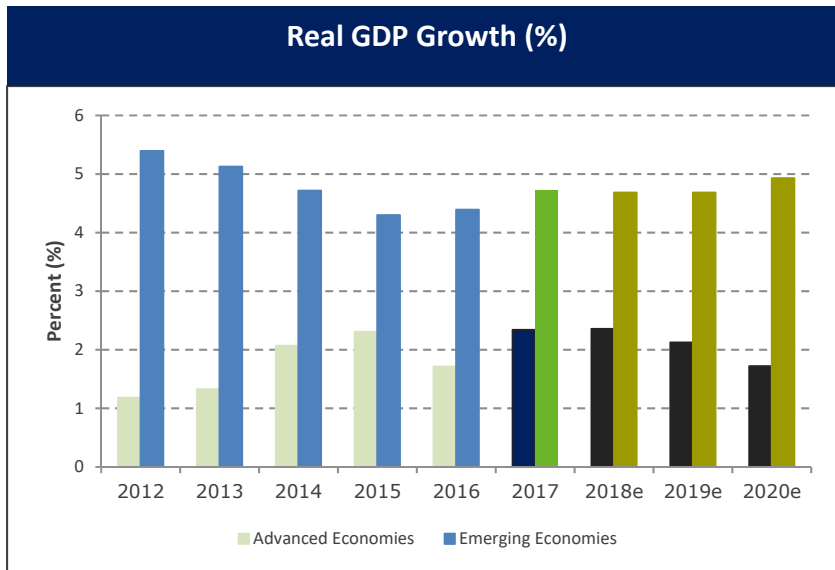
Asset Type	Yield (%)	Average Ratings
EM Local (JPM GBI EM Global Index)	6.5	BBB
EM Hard Currency Corporate (JPM CEMBI Broad Index)	6.2	BBB
EM Hard Currency Sovereigns (JPM EMBI Global)	7.1	BB

- ### Comments
- **Total emerging market debt universe has grown substantially, from \$500 million at the end of 2000 to almost \$2 trillion by 2019**
 - **This is helped by the ability of EM countries to issue debt in their local currencies, and the growth of the EM corporate sectors**



Source: J.P. Morgan, as of Dec 2018

SUPERIOR GROWTH IN EMERGING MARKETS

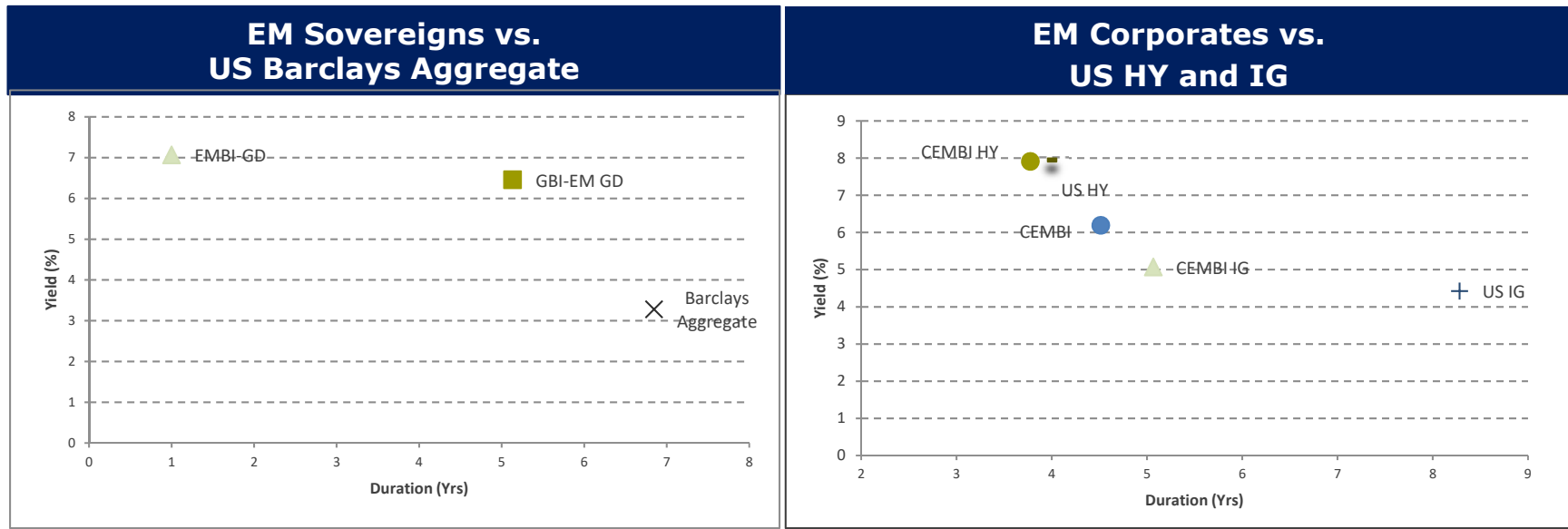


- ### Comments
- **Real GDP growth rates for emerging economies continue to outpace advanced economies**
 - **Growth gap between EM vs. DM is forecasted to widen for the next three years in favor of emerging countries as developed markets slow down slightly**
 - **Inflation however is stabilizing and forecast to come down in EM**
 - **Inflation gap between EM vs. DM might trend narrower in the near future**



Source: International Monetary Fund (IMF), as of October 2018

**EMERGING MARKET CORPORATE DEBT:
BETTER YIELD WITH SIMILAR OR LOWER DURATION RISK**



Comments

- **EM Local and Hard currency sovereigns (GBI-EM GD and EMBI-GD indices respectively) have shorter duration and higher yields compared to the US Barclays Aggregate which is concentrated in US duration risk**
- **Emerging markets high yield corporates offer better yield for slightly shorter duration profile versus US high yield**
- **In investment grade sector, EM Corporates offer better yield for much lower interest rate risk (over 3 years shorter duration)**

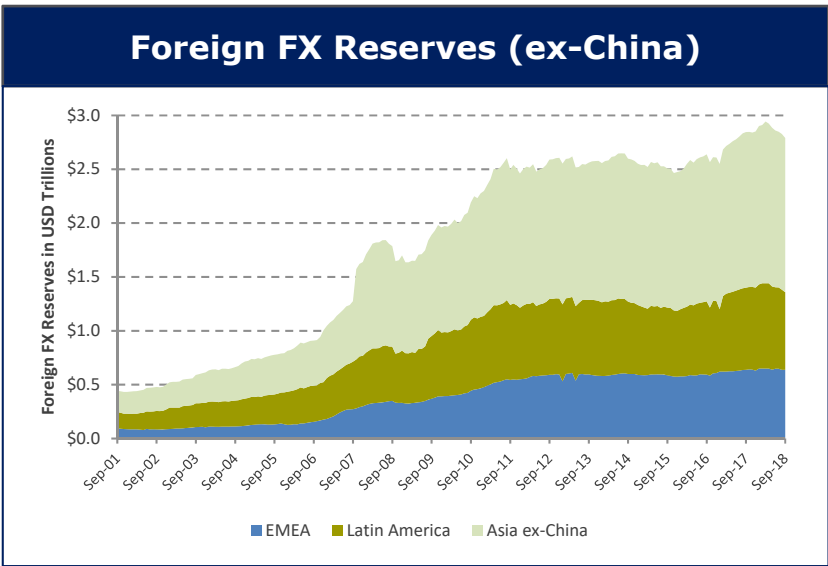
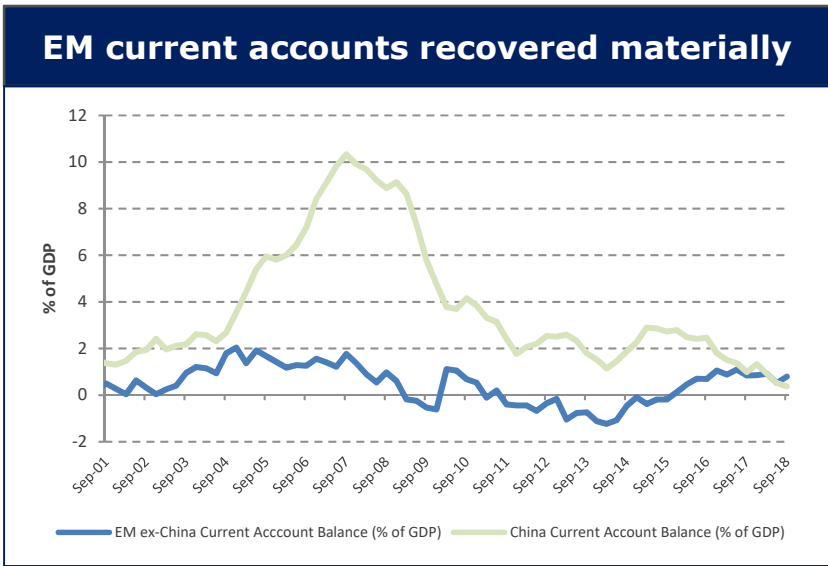


Source: Bloomberg, J.P. Morgan, as of December 2018

EM COUNTRY FUNDAMENTALS

Comments

- **EM ex China current accounts have recovered and continue to stabilize**
- **Foreign reserves are at healthy levels, mitigating concerns of FX crisis**
- **EM growth has slowed in the near term, but forecasts remain at a healthier level compared to DM**



Source: IMF, J.P. Morgan

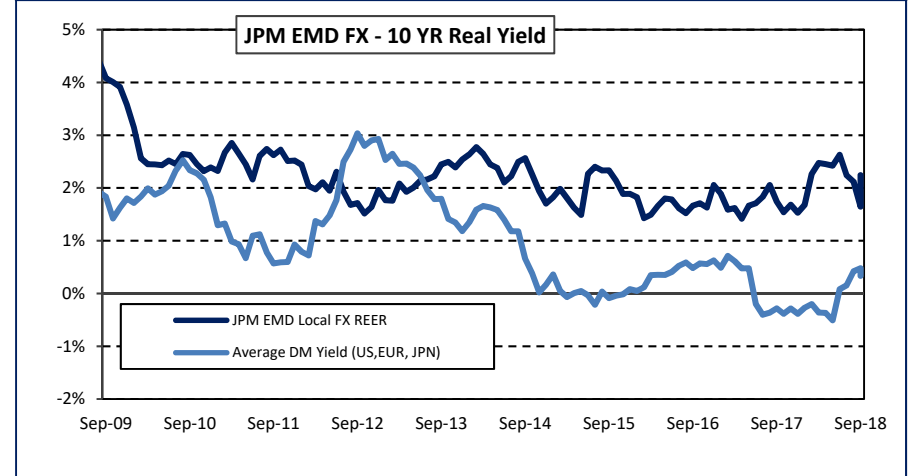


LOCAL RATES & CURRENCIES BOTH ATTRACTIVE

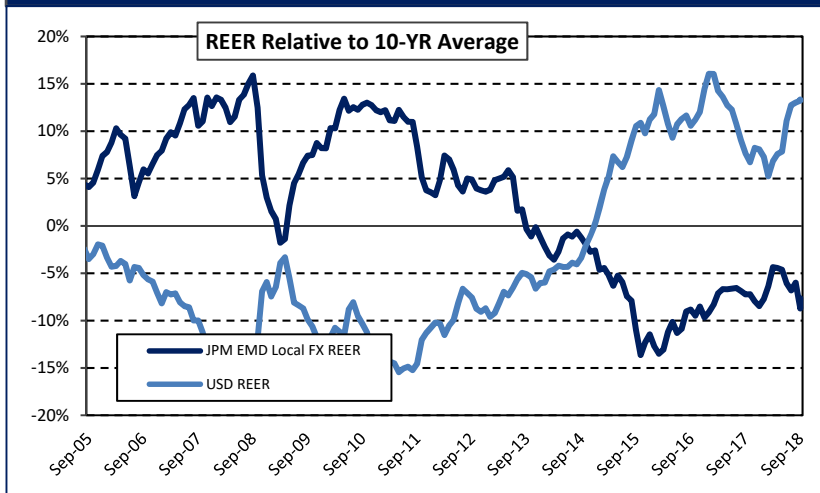
Comments

- **Emerging markets real rates and FX remain attractive relative to DM**
 - Though the gap has narrowed slightly due to rate hikes in the US
- **Huge outflows in local currency, and to a lesser extent hard currency EMD in 2018**
 - Setting up for favorable technicals in the new year

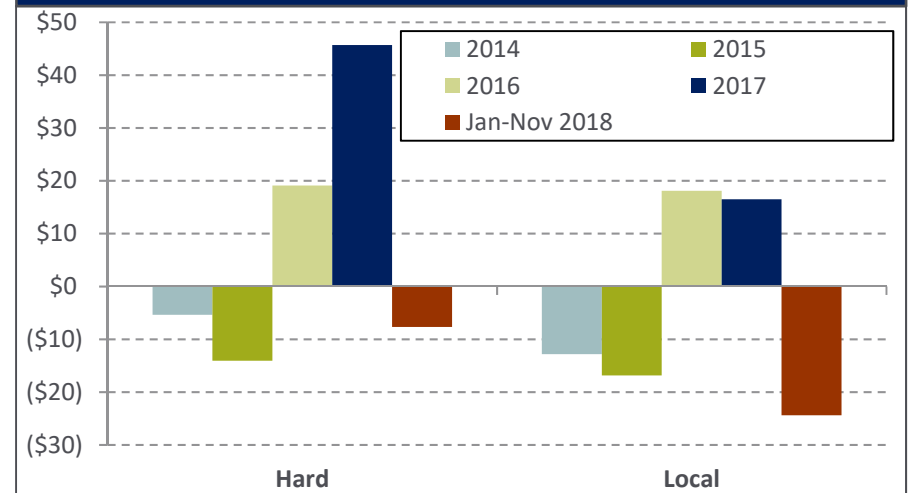
Real Yield Differential EM vs. DM



Currencies Still Attractive on REER basis



Emerging Market Mutual Fund Flows



Source: Barclays, J.P. Morgan, EPFR, NEPC

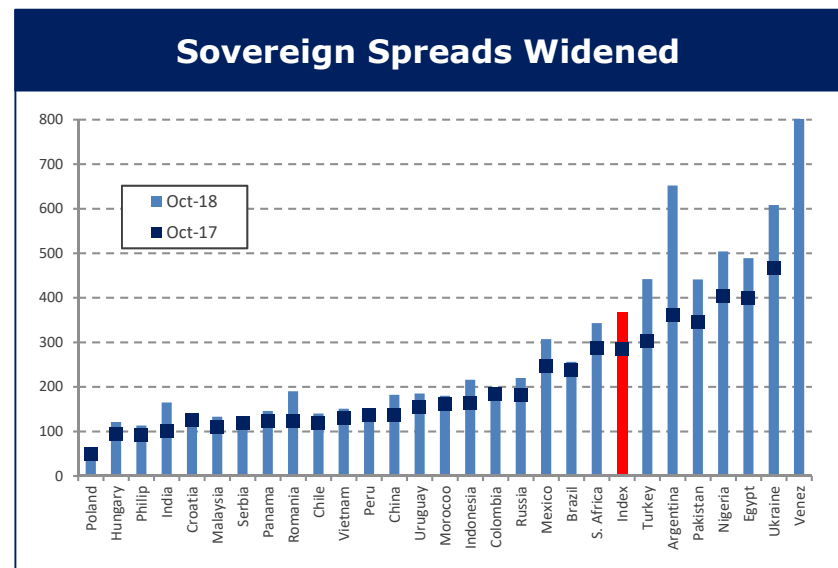
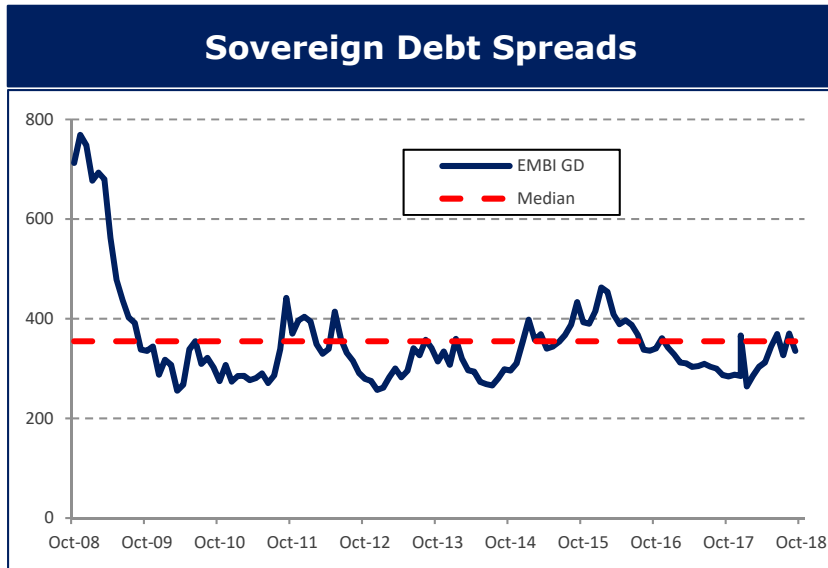


EXTERNAL EM SOVEREIGN DEBT

Comments

- **External sovereign valuations improved in 2018**
 - Spreads widened throughout the year
 - Sovereign spreads are now right around long-term median

- **Spreads widened across the board in 2018**
 - Notable countries where spreads widened the most include Venezuela, Turkey and Argentina.



Source: J.P. Morgan, International Monetary Fund



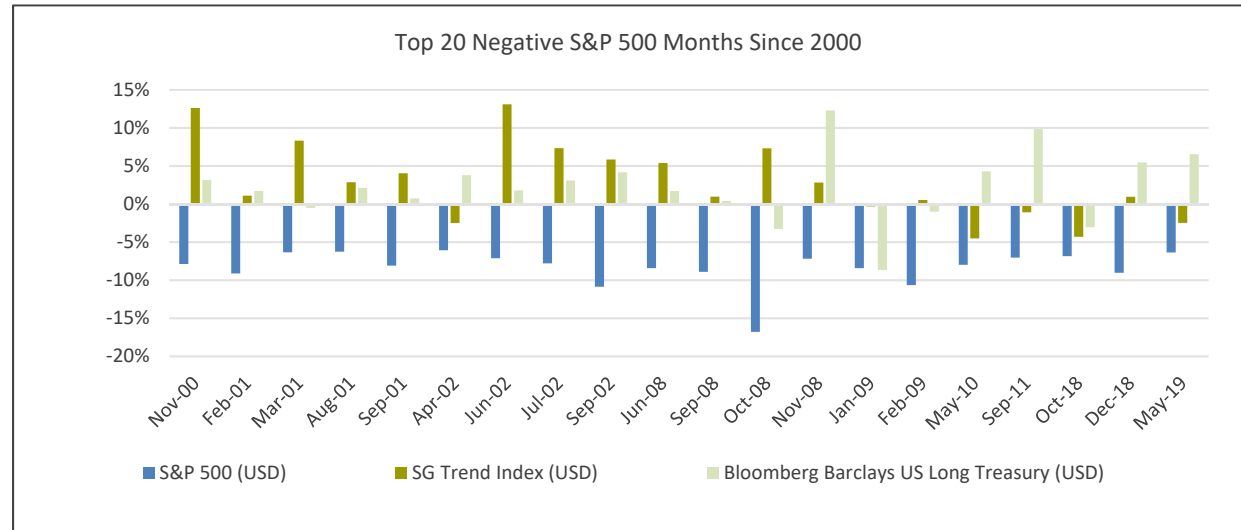
CRISIS PROTECTION CLASS

NEPC, LLC

NEGATIVE MONTH ANALYSIS

Since 2000, the SG Trend Index was positive in 70% (14) of the top-20 S&P 500 down months

During the same period, Long Treasuries were positive in 75% (15) of those months



Source: eVestment; Based on performance since January 2000 through June 2019; Past performance is not indicative of future results

HISTORICAL STATISTICAL ANALYSIS

	Correlation - Up Markets	Correlation - Down Markets	Outperform All Period Percent	Outperform Down Period Percent	Outperform Up Period Percent	Down Capture Ratio	Up Capture Ratio	Negative Periods	Percent Profitable Periods
January 2000 - December 2008									
SG Trend Index	(0.24)	(0.50)	52%	68%	39%	-62%	12%	46	57%
Long Treasury	(0.16)	(0.07)	56%	96%	26%	-120%	4%	36	67%
S&P 500	-	-	-	-	-	-	-	47	56%
January 2009 - June 2019									
SG Trend Index	0.05	0.02	38%	69%	26%	38%	4%	62	51%
Long Treasury	(0.21)	(0.13)	38%	83%	20%	-126%	-1%	59	53%
S&P 500	-	-	-	-	-	-	-	36	71%

- **Historical downside statistics solid for Trend and Long Treasuries**
 - Negative S&P 500 correlation in down markets; decent outperformance in down periods; negative down capture (returns historically positive in down markets)
- **Post-crisis experience differs in some aspects**
 - Trend has exhibited positive, albeit modest correlation to the S&P 500 in down markets and some down capture

Source: eVestment; Based on performance since January 2000 through June 2019; Past performance is not indicative of future results

*Long Treasury represents the Bloomberg Barclays Long US Treasury Index

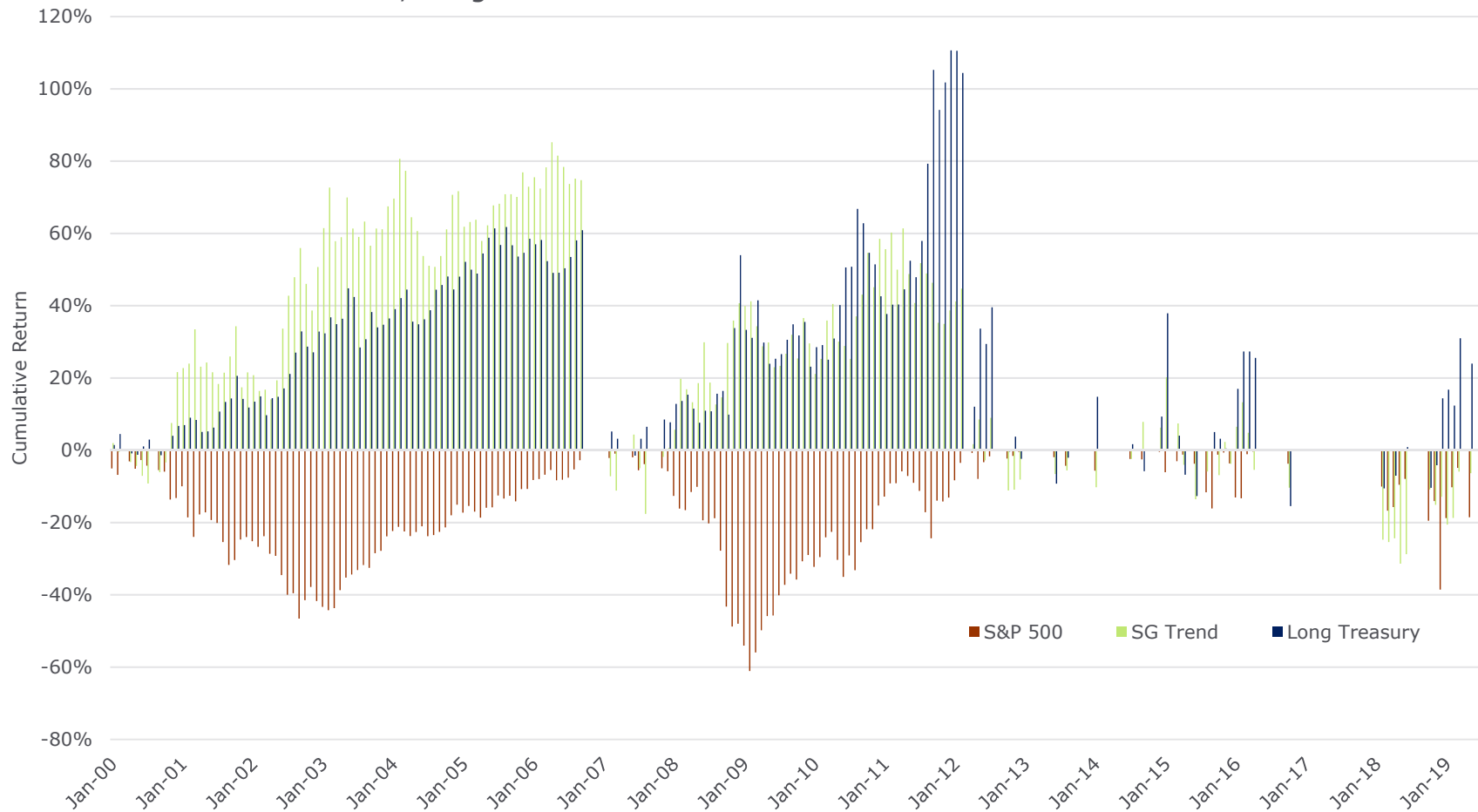
**All statistics relative to S&P 500 except for Negative Periods and Percent Profitable Periods



HISTORICAL DRAWDOWN ANALYSIS

Trend and Long Treasuries exhibited positive cumulative returns during historic extended equity drawdowns

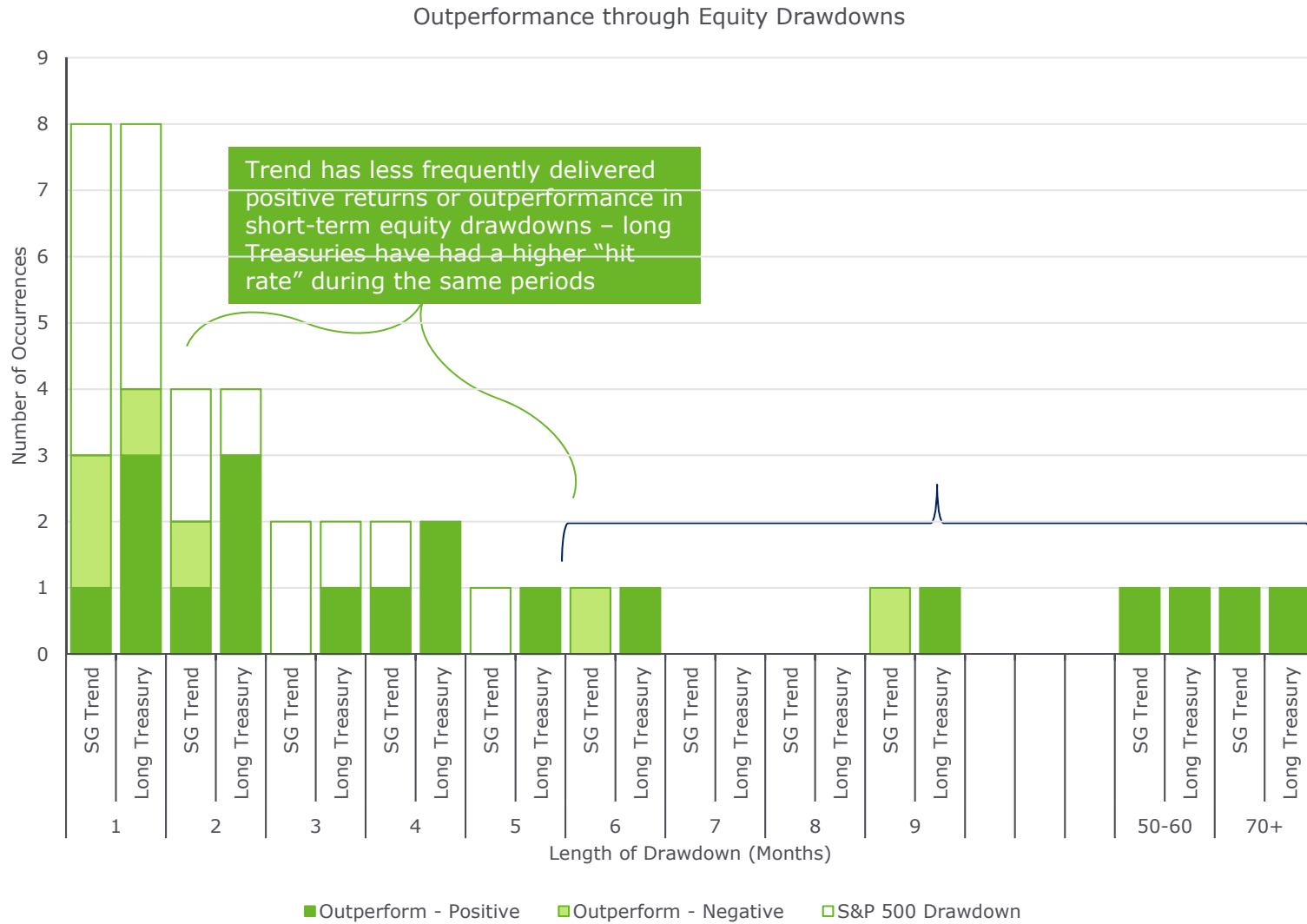
- Early 2000s drawdown, Trend exceeded Long Bonds
- GFC drawdown, Long Treasuries exceeded Trend



Source: eVestment; Based on cumulative performance during S&P 500 drawdown periods since January 2000 through June 2019; Past performance is not indicative of future results



DRILLING DEEPER INTO DRAWDOWNS



Source: eVestment; Based on S&P 500 drawdowns since January 2000 through June 2019; Past performance is not indicative of future results